HYDROGEN VALUE CHAIN: THE DEVELOPMENT OF NEW TECHNOLOGIES FOR THE ITALIAN ENERGY TRANSITION PATHWAY

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Hydrogen has been identified as an energy vector for decarbonisation and the EU priority (European Hydrogen Strategy - 8 July 2020) is to favor its use in all those sectors where the direct use of electricity produced from renewable sources is not it's possible.

In the medium to long term, the aim is to produce renewable - green hydrogen (from sun, wind, biomass); this is the option most compatible with the objectives of climate neutrality set by the EU by 2050 and zero pollution in the long term.

Numerous Member States have already launched their own Hydrogen Strategy and have implemented initiatives to foster the growth and development of the hydrogen economy. Italy also published the national Hydrogen Strategy Guidelines the last December and included the issue of hydrogen among the priorities of the PNRR.

To support a growth process it is necessary at the same time to carry out R&D activities along the entire hydrogen value chain in the various sectors: energy, mobility, industry and residential. The national R&D activities, although in the last few decades hydrogen passed through cyclical waves of great enthusiasm and profound scepticism, have never stopped. Now that hydrogen is indisputably affirmed as key factor to foster the energy transition, also ENEA, thanks to the experience and skills gained over the years, can support research, innovation, experimentation, technology transfer and industrial development, at National, European and International level.

ENEA, through the Department of Energy Technologies and Renewable Energy Sources, is involved in R&D activities covering the overall hydrogen value chain, dealing with the development of processes, components and systems in the fields of hydrogen production, storage and end uses, from basic research on materials to applied research and demonstration in real environment conditions. Innovative applications always include technical and economic assessment and evaluation, simulation, prototype design and fabrication, and bench and field testing under selected operating conditions. Moreover, ENEA, in collaboration with national stakeholders, is starting the implementation of a real Hydrogen demo Valley at own research center of Casaccia (close to Rome), where the aforementioned comparative assessment at demonstration scale could takes place. The project is part of the international partnership initiative Mission Innovation, Challenge IC # 8 "Renewable and Clean Hydrogen" and is funded by the Italian Ministry of Ecological Transition. It will be possible to evaluate which technologies are ready for the hard to abate industrial sectors, increase awareness of hydrogen solutions within industry and contribute to the policy makers discussion on support mechanisms for hydrogen conversion and use in industry.